

**REMARKS**

Applicant would like to thank Examiners Padmanabhan and Cotton for the courteous and helpful Interview conducted March 1, 2006, which materially advanced prosecution in this case.

During the Interview, Applicant's representative and the Examiners discussed amending the claims by inserting into the independent claims the formula for the silicone emulsifier at page 6, line 17 in the present application. It was discussed how this amendment should sufficiently distinguish the claimed invention from Nadaud for at least the reason that Nadaud's silicone emulsifiers contain a pendant fatty chain (represented by p=7-17 at col. 3, line 29), whereas the silicone emulsifiers defined by the formula at page 16, line 17 of the present application do not possess this fatty chain.

Applicant has amended the present claims to incorporate the formula at page 6, line 17 into each pending claim. Thus, as discussed above and at the Interview, Nadaud cannot teach or suggest the claimed invention.

During the Interview, the Examiners also stated that they would like to make sure that the four commercial products disclosed by Nadaud at col. 3, lines 37-40 did not fall within the formula at page 6, line 17. Submitted herewith is manufacturer's information indicating that Abil WE 09 and Abil EM 90 contain cetyl dimethicone copolyol (that is, they contain a pendant fatty chain) as well as oxypropylenation (PPG) and, thus do not fall within the claimed formula. Also submitted are U.S. patents 5,851,539 and 6,151,211 which indicate that 218-1138 contains a pendant fatty chain ('539 patent at col. 8, lines 15-42 – "a" is not

zero, so the R<sub>1</sub> alkyl radical is present in 218-1138) and that Q2 3225 C contains 50% oxypropylenation ('211 patent at col. 3, lines 29-35). Accordingly, these surfactants do not fall within the claimed formula as well.

Furthermore, Applicant reiterates its arguments made during the Interview that Nadaud cannot teach or suggest the claimed invention because Nadaud relates to multiple emulsions, not W/O emulsions. Nadaud's examples in which an intermediate W/O emulsion is used to produce the desired final product (multiple emulsion) neither teaches nor suggests the claimed invention. First, no motivation would have existed to ignore Nadaud's teachings regarding multiple emulsions to produce a simple W/O emulsion. That is, one skilled in the art, following Nadaud's teachings, would not have produced a W/O emulsion – he would have produced a multiple emulsion. Second, Nadaud's intermediate W/O emulsions, by themselves, do not satisfy all of the requirements in the claims (for example, 80% aqueous phase), and no motivation would have existed to modify the intermediate products in such a way as to arrive at the claimed invention.

Finally, as discussed during the Interview, the data submitted and discussed in the present application and in the Rule 132 declarations demonstrate that compositions containing the claimed surfactants have “surprising and unexpected” properties as compared to compositions containing other silicone surfactants. In particular, Applicant notes that this data shows that the claimed surfactants having only oxyethylenated groups yield compositions having better properties than compositions containing silicone surfactants having 50% oxypropylenated groups (see, for example, Q2 3225 C above).

Application No. 09/884,949

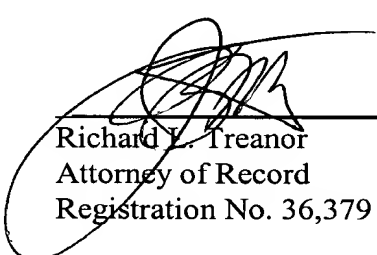
Response to Office Action dated January 11, 2006

In view of the above, Applicant respectfully requests reconsideration and withdrawal of the pending § 103 rejection based on Nadaud.

Applicant believes that the present application is in condition for allowance. Prompt and favorable consideration is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



---

Richard L. Treanor  
Attorney of Record  
Registration No. 36,379

Jeffrey B. McIntyre  
Registration No. 36,867

Customer Number

**22850**

Tel #: (703) 413-3000

Fax #: (703) 413-2220

## **ABIL<sup>®</sup> EM 90**

**Emulsifier for the formulation of cosmetic W/O creams and lotions**

- Low usage concentration of 1.5 - 2.5 %
- Emulsifier for "light" W/O emulsions with pleasant application properties
- Emulsifier for the preparation of multiple emulsions
- Stable emulsions without co-emulsifiers and with low amounts of consistency-enhancing waxes
- Formulations with all kinds of cosmetic oils
- High compatibility with active ingredients
- Emulsions with high heat and freeze stability
- Liquid at room temperature

**Goldschmidt Personal Care**

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)

**INCI name (CTFA name)**

Cetyl PEG/PPG-10/1 Dimethicone

**Chemical and physical properties  
(not part of specifications)**

Form	liquid
HLB-value	approx. 5

**Application**

ABIL® EM 90 is a non-ionic W/O emulsifier which is based on silicone.

The high emulsion stabilizing potential of ABIL® EM 90 is caused by the polymeric and polyfunctional structure.

- Consistency-providing or emulsion-stabilizing waxes are required only in amounts up to 2 %. Amongst others, hydrogenated castor oil in combination with high-melting hydrocarbon waxes or beeswax are suitable.
- The optimum range for the content of oil phase is between 22 and 35 %.
- Substances which can be processed include not only paraffin oils, which from the emulsion-technological point of view provide relatively few problems, but also fatty acid esters of short- and long-chain alcohols, silicone derivatives and vegetable triglycerides which are known to be difficult to emulsify.
- Substances with specific properties, such as UV filters, plant extracts, moisturizers and antiperspirants, are well tolerated by the emulsion.
- The creams and lotions are distinguished by high stability towards heat and freezing stress; stability between -25 °C and +60 °C is attainable.
- Emulsions in which the oil phase contains predominantly substances with good spreading properties have good rub-out characteristics and are rapidly absorbed by the skin. On the other hand, creams which contain only highly viscous oils as emulsifiable substances, e. g. vegetable triglycerides, have a "heavy" action, whilst maintaining pleasant application properties.
- ABIL® EM 90 is suitable for the formulation of W/O creams and lotions.
- ABIL® EM 90 can be used for the preparation of multiple emulsions of the type W/O/W and O/W/O. [ P. Hameyer, K.R. Jenni, Emulsifiers for Multiple Emulsions - Optimization of stability by constitution and Molecular Weight, Parfümerie und Kosmetik 12 ( 1994 ), 842 - 850 ]
- A boosting-effect of the protection factor in W/O sunscreen formulations based on ABIL® EM 90 in combination with ABIL® Wax 9801 or ABIL® Wax 9840 can be determined.
- The amount used, referred to the emulsion, is only 1.5 - 2.5 %. In formulations with a high water content the additional use of about 1 % ISOLAN® GI 34 is recommended to improve the application properties.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

*This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)*

## **Influence on the viscosity of the emulsion**

The viscosity of the W/O emulsions based on ABIL® EM 90 can be regulated via three variables.

### **1. Viscosity of the oil phase**

The viscosity of the external phase correlates directly with the viscosity of the emulsion. This means that it increases when low viscosity oils in a formulation are replaced by more viscous oils or when waxes are added; the latter show distinct effects even at 0.5 - 1.0%.

### **2. Phase ratio**

In emulsions with predominant content of dispersed phase - as in the cosmetic W/O preparations - the viscosity increases significantly when the proportion of the dispersed phase is increased. The reason for this is the interaction between the dispersed water droplets which becomes stronger with increasing packing density. Therefore ABIL® EM 90 creams on average have lower oil contents than lotions. Depending on the emulsifiable substances, creams can be prepared about 20 - 33 % of oil phase, lotions about 25 - 35%.

A given oil phase can be processed to form stable viscous liquid or cream-like emulsions when its proportion is in the optimum range for stability of the emulsion. E. g. decyl oleate forms creams with 19 - 21% of oil phase and lotions with 22 - 25 % (see graph).

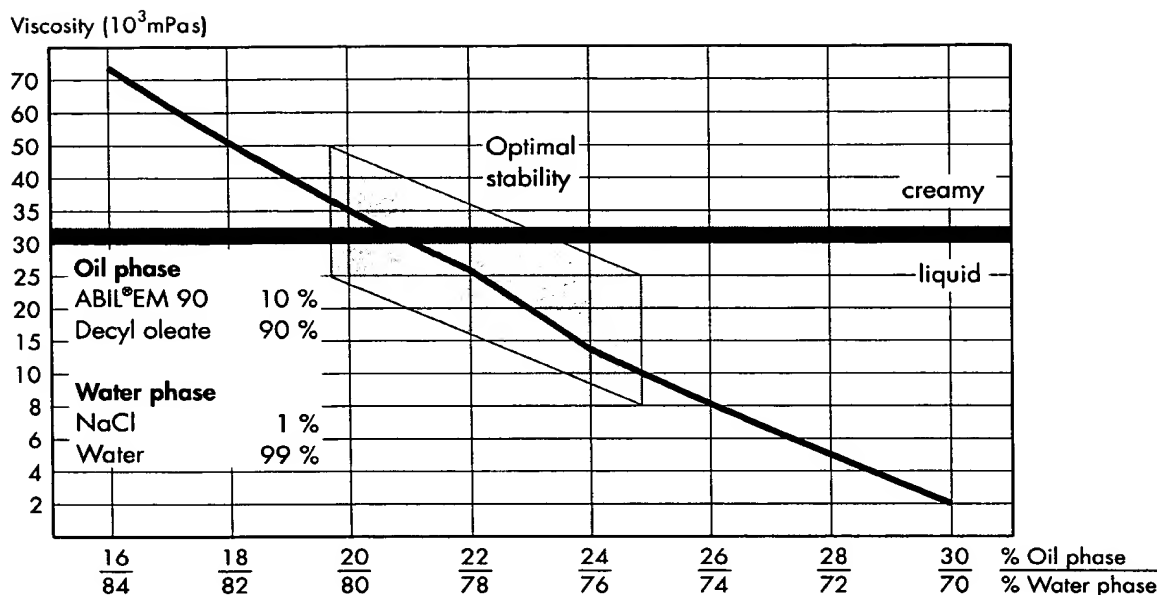
Outside these limits the stability of the emulsion is reduced because the dispersed water phase is too high or the viscosity of the emulsion too low. This working range is displaced to higher percentages when oils or oil/wax mixtures with higher viscosity are used.

### **3. Degree of dispersion**

An additional parameter having an influence on viscosity is the degree of dispersion, which, however, should not be used for regulation of viscosity due to its effect on the stability of the emulsion. The viscosity increases when, due to mechanical processing, the diameter of the droplets is reduced and the specific boundary area between the phases is thereby increased. For this reason cream formulations are still liquid in the pre-emulsion state because of their coarse degree of dispersion.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

*This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)*



## Preparation

A pre-requisite is the careful adjustment of the formulation (phase ratio, viscosity of the oil phase) and optimum emulsification. The particle size for creams which are stable over a long period of time is below  $1 \mu\text{m}$ , for lotions approx.  $2 - 4 \mu\text{m}$ . More coarsely dispersed emulsions tend to separate.

Thorough, but not too intensive homogenization is required. Extreme energy input frequently causes the formation of highly viscous, metastable secondary structures which break down on storage. Under such conditions lotions can transiently assume cream-like consistency, e. g. by several passages through a colloid mill.

Optimum manufacturing conditions correspond to the principles of normal production processes for W/O emulsions. The water phase is incorporated slowly into the oil phase which contains the emulsifier while stirring intensively. The coarsely dispersed pre-emulsion is then homogenized. The final homogenization should be performed below  $30^\circ\text{C}$ .

The temperature programme is variable and can take the form of:

- hot/hot procedure (H/H)
- hot/cold procedure (H/C)

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)

In addition to the traditional hot/hot procedure (both phases 80 - 90 °C) the hot/cold procedure can be used. It is characterized by incorporation of the cold water phase (15 - 30 °C) into the hot oil phase which significantly shortens the time of manufacture. Homogenization should be carried out below 30 °C in order to ensure that the waxes are largely recrystallized.

The decisive criterion for production is the viscosity. Mechanical processing is discontinued when the viscosity is equal to that of the standard emulsion developed and tested in the laboratory.

## Emulsifying machines

Stirring equipment or planetary mixers with high sheering force are very suitable for the manufacture of creams and lotions on the laboratory and production scale, provided that they guarantee uniform work-up of the emulsion. Machines predominately used in the cosmetic industry, which are equipped with stirrer, stripper and rotor-stator homogenizer, fulfil all requirements for optimum emulsification. However, utilization of their maximum capacity may result in over-emulsification. High-pressure emulsifiers may cause problems because of the danger of over-emulsification and liberation of water due to cavitation.

## Recommended usage concentration

1.5 - 2.5 % ABIL® EM 90

## Packaging

180 kg drum

## Hazardous goods classification

### Information concerning

- classification and labelling according to regulations for transport and for dangerous substances
- protective measures for storage and handling
- measures in case of accidents and fires
- toxicity and ecological effects

is given in our material safety data sheets.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)



## Guide Line Formulations

<b>W/O Cream with Vitamine E F 74/96</b>	
<b>Phase A</b>	
ABIL <sup>®</sup> EM 90	2.0 %
ISOLAN <sup>®</sup> GI 34 (Polyglyceryl-4 Isostearate)	1.0 %
Jojoba (Buxus Chinensis) Oil	5.0 %
TEGOSOFT <sup>®</sup> CT (Caprylic/Capric Triglyceride)	9.0 %
TEGOSOFT <sup>®</sup> OP (Ethylhexyl Palmitate)	6.5 %
Tocopheryl Acetate	1.5 %
Hydrogenated Castor Oil	0.8 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	1.2 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
Panthenol	0.5 %
Water	72.0 %
Preservative, Parfum	q.s.

<b>W/O All Purpose Cream F 61/96</b>	
<b>Phase A</b>	
ABIL <sup>®</sup> EM 90	2.0 %
ISOLAN <sup>®</sup> GI 34 (Polyglyceryl-4 Isostearate)	1.0 %
Mineral Oil (30 mPas)	12.0 %
TEGOSOFT <sup>®</sup> OS (Ethylhexyl Stearate)	5.0 %
Hydrogenated Castor Oil	0.8 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	1.2 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
Water	77.5 %
Preservative, Parfum	q.s.

<b>W/O Body Lotion BK 32/96</b>	
<b>Phase A</b>	
ABIL <sup>®</sup> EM 90	2.0 %
TEGOSOFT <sup>®</sup> OS (Ethylhexyl Stearate)	7.0 %
TEGOSOFT <sup>®</sup> liquid	7.0 %
Isohexadecane	7.0 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	0.5 %
Hydrogenated Castor Oil	0.5 %
<b>Phase B</b>	
Water	73.5 %
Sodium Chloride	0.5 %
LACTIL <sup>®</sup>	2.0 %
Preservative, Parfum	q.s.

<b>W/O Make-up BK 04/97</b>	
<b>Phase A</b>	
ABIL <sup>®</sup> EM 90	2.0 %
ISOLAN <sup>®</sup> GI 34 (Polyglyceryl-4 Isostearate)	1.0 %
ABIL <sup>®</sup> Wax 2434	4.0 %
TEGOSOFT <sup>®</sup> CT (Caprylic/Capric Triglyceride)	9.0 %
TEGOSOFT <sup>®</sup> OS (Ethylhexyl Stearate)	8.0 %
Hydrogenated Castor Oil	0.4 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	0.6 %
Titanium Dioxide	4.0 %
Iron Oxide	1.0 %
<b>Phase B</b>	
Sodium Chloride	0.6 %
Water	69.4 %
Preservative, Parfum	q.s.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

*This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)*

<b>W/O Lotion with Vitamine F 14/97</b>	
<b>Phase A</b>	
ABIL® EM 90	2.0 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	0.5 %
Hydrogenated Castor Oil	0.5 %
Jjoba (Buxus Chinensis) Oil	5.0 %
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	10.0 %
TEGOSOFT® OP (Ethylhexyl Palmitate)	3.0 %
Ethylhexyl Ethylhexanoate	5.0 %
Tocopheryl Acetate	1.5 %
Retinyl Palmitate	0.5 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
Allantoin	0.2 %
Panthenol	0.5 %
LACTIL® (Sodium Lactate; Sodium PCA; Glycine; Fructose; Urea; Niacinamide; Inositol; Sodium Benzoate; Lactic Acid)	2.0 %
Water	68.8 %
Preservative, Parfum	q.s.

<b>Multiple Emulsion of W<sub>1</sub>/O/W<sub>2</sub> type F 30/96</b>	
<b>W<sub>1</sub>/O Emulsion</b>	
<b>O</b>	
ABIL® EM 90	1.50 %
Jjoba (Buxus Chinensis) Oil	1.00 %
TEGOSOFT® DO (Decyl Oleate)	2.00 %
Mineral Oil (30 mPas)	8.00 %
<b>W<sub>1</sub></b>	
Water	34.75 %
Glycerin	2.00 %
Sodium Chloride	0.25 %
Panthenol	0.50 %
Preservative, Parfum	q.s.
<b>Wasserphase W<sub>2</sub></b>	
TEGO® Betain F (Cocamidopropyl Betaine)	0.60 %
Acrylates/C <sub>10-30</sub> Alkyl Acrylate Crosspolymer (Carbopol 1382, BF Goodrich)	0.10 %
Water	49.30 %
Sodium Hydroxide (10 % in water)	q.s.
Preservative, Parfum	q.s.
<b>Preparation:</b>	
1) W <sub>1</sub> O Emulsion: Stir W <sub>1</sub> into O, homogenise.	
2) W <sub>2</sub> -solution: Dissolve Betaine in water, disperse Carbopol 1382 and neutralise with NaOH pH about 6.5.	
3) Mix one part W <sub>1</sub> /O and one part W <sub>2</sub> , stir 2 to 5 minutes.	

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)

W/O Sun Protection Lotion containing TiO <sub>2</sub> SPF (DIN): 15 BK 14/94	
<b>Phase A</b>	
ABIL <sup>®</sup> EM 90	2.5 %
TEGOSOFT <sup>®</sup> OS (Ethylhexyl Stearate)	8.5 %
Mineral Oil (30 mPas)	8.5 %
Cyclomethicone	6.0 %
ABIL <sup>®</sup> Wax 9801 (Cetyl Dimethicone)	1.0 %
Hydrogenated Castor Oil	0.5 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	1.0 %
<b>Phase B</b>	
Titanium Dioxide	8.0 %
<b>Phase C</b>	
Sodium Chloride	0.5 %
Water	63.5 %
Preservative, Parfum	q.s.

W/O Sun Protection Lotion containing TiO <sub>2</sub> and organic UV-filters SPF (DIN): 14 BK 13/95	
<b>Phase A</b>	
ABIL <sup>®</sup> EM 90	2.5 %
TEGOSOFT <sup>®</sup> OP (Ethylhexyl Palmitate)	2.0 %
TEGOSOFT <sup>®</sup> OS (Ethylhexyl Stearate)	12.75 %
ABIL <sup>®</sup> Wax 9840 (Cetyl Dimethicone)	0.25 %
Isohexadecane	7.0 %
Hydrogenated Castor Oil	0.5 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	1.0 %
Ethylhexyl Methoxycinnamate	3.0 %
Titanium Dioxide (and) Ethylhexyl Palmitate	8.0 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
Water	62.5 %
Preservative, Parfum	q.s.

E 04/01

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

*This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)*

## **ABIL<sup>®</sup> WE 09**

**Emulsifier for the formulation of W/O creams and lotions**

- Formulations of sunscreen products with high sun protection factor
- Formulations with all kinds of cosmetic oils
- High compatibility with active ingredients
- Emulsions with high heat and freeze stability
- Liquid at room temperature

**Goldschmidt Personal Care**

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

*This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)*

## INCI name (CTFA name)

Polyglyceryl-4 Isostearate; Cetyl PEG/PPG-10/1 Dimethicone; Hexyl Laurate

### Chemical and physical properties (not part of specifications)

Form	liquid
HLB-value	approx. 5

## Application

ABIL® WE 09 is a liquid nonionic W/O emulsifier which is distinguished by high emulsifying and emulsion-stabilizing action. The extremely favourable usage characteristics are achieved by the combination of a polyglycerol fatty acid ester with a silicone surfactant, the characteristic of which is the polymeric and polyfunctional structure.

- ABIL® WE 09 allows the preparation of cosmetic W/O creams and lotions.
- The amount required, referred to the emulsion, is 4 - 6 %.
- Waxes for adjusting consistency and stabilizing the emulsions are required in amounts of 1.5 - 3.0 %. Amongst others, hydrogenated castor oil in combination with high-melting hydrocarbon waxes or beeswax are suitable.
- The content of the oil phase (including the emulsifiers) can be varied between 19 % and 35 %.
- In principle, all known lipid bases can be incorporated: fatty acid esters of short- and long-chain alcohols, paraffin oils, native triglycerides, lanolin and silicone derivatives.

- Substances with specific properties, such as plant extracts, UV-filters, moisturizers and antiperspirants, are well tolerated by the emulsions.
- Creams and lotions are distinguished by high stability towards heat and freezing. Stable emulsions between -25 °C and +60 °C are attainable.
- Emulsions, the oil phase of which consists predominantly of substances with good spreading properties, can be easily rubbed into the skin and are rapidly absorbed by the latter. On the other hand, creams which contain high viscous oils, e. g. vegetable triglycerides, for a "more rich" skin feeling, maintain good application properties.
- Sunscreen preparations are distinguished by high sun protection factors with respect to the amount of filter used.

## Influence on the viscosity of the emulsion

The viscosity of the W/O emulsions based on ABIL® WE 09 can be adjusted by three variables.

### 1. Viscosity of the oil phase

The viscosity of the external phase correlates directly with the viscosity of the emulsion. This means that it increases when low viscosity oils in a formulation are replaced by more viscous oils or when waxes are added; the latter show distinct effects even at 0.5 - 1.0 %.

### 2. Phase ratio

In emulsions with predominant content of dispersed phase - as in the cosmetic W/O preparations - the viscosity increases significantly when the proportion of the dispersed phase is increased.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular,

The reason for this is the interaction between the dispersed water droplets which becomes stronger with increasing packing density. Therefore ABIL® WE 09 creams on average have lower oil contents than lotions. Depending on the emulsifiable substances, creams can be prepared about 19 - 30 % of oil phase, lotions about 23 - 35%.

### 3. Degree of dispersion

An additional parameter having an influence on viscosity is the degree of dispersion, which, however, should not be used for regulation of viscosity due to its effect on the stability of the emulsion. The viscosity increases when, due to mechanical processing, the diameter of the droplets is reduced and the specific boundary area between the phases is thereby increased. For this reason cream formulations are still liquid in the pre-emulsion state because of their coarse degree of dispersion.

### Interactions between content of oil phase, degree of dispersion and stability

These mutual influences, which are stability-determining, may be illustrated as follows: The viscosity of the emulsions decreases, when the content of oil phase is increased; it increases when the emulsification is intensified and the degree of dispersion is thereby made finer.

Thus, for example, moderate stirring of 20 % of a mixture of ABIL® and paraffin oil and 80 % of aqueous phase forms a viscous lotion. An emulsion of the same viscosity is formed when 30 % of the above oil phase and 70 % of aqueous phase are homogenized very intensively using a colloid stirrer. Preparations, in which the oil phase content lies between these limits can be prepared by appropriate stepwise reduction of the energy of emulsification. In contrast to the viscosity, the stabilities of these emulsions are at different levels. 22 - 24 % lotions of paraffin oil which have been prepared by intensive stirring or comparable emulsification in a rotor-stator apparatus, lie in the optimum range. Paraffin oil creams of equal viscosity which have been prepared under appropriate conditions contain 16 - 26 % of oil phase; the optimum stability range is 19 - 21 % (see graph).

The graphs are based on emulsions of the following composition:

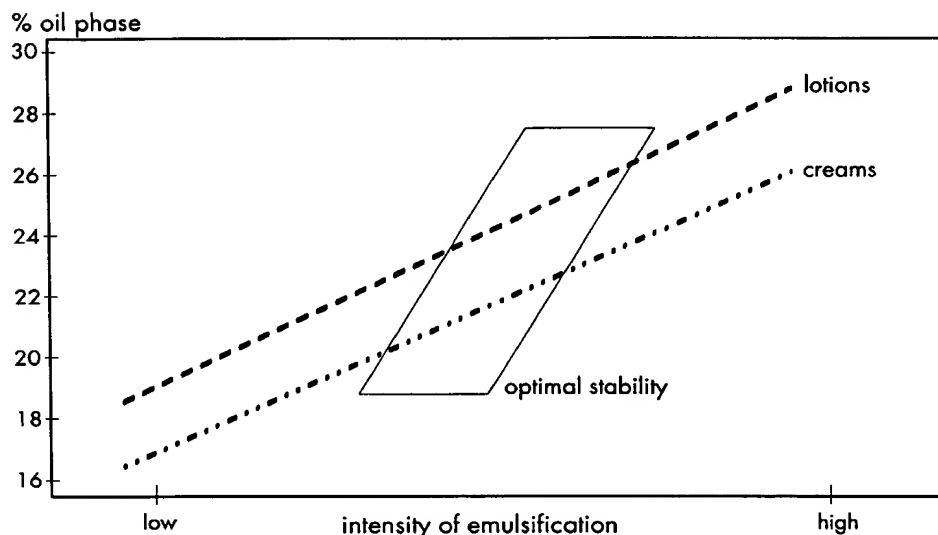
ABIL® WE 09/paraffin oil (1 : 4)  
16.0 - 30.0 %

Aqueous sodium chloride solution (1 %)  
84.0 - 70.0 %

The viscosity of the lotions is about 5.000 mPas, that of the creams about 22.000 mPas (rotation viscosimeter).

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)



## Preparation

A pre-requisite is the careful adjustment of the formulation (phase ratio, viscosity of the oil phase) and optimum emulsification. The particle size for creams which are stable over a long period of time is below 1 µm, for lotions approx. 2 - 4 µm. More coarsely dispersed emulsions tend to separate.

Thorough, but not too intensive homogenization is required. Extreme energy input frequently causes the formation of highly viscous, metastable secondary structures which break down on storage. Under such conditions lotions can transiently reach cream-like consistency, e. g. by several passages through a colloid mill.

Optimum manufacturing conditions correspond to the principles of normal production processes for W/O emulsions. The water phase is incorporated slowly into the oil phase which contains the emulsifier while stirring intensively. The coarsely dispersed pre-emulsion is then homogenized. The final homogenization should be performed below 30 °C.

The temperature programme is variable and can take the form of:

- hot/hot procedure (H/H)
- hot/cold procedure (H/C)

In addition to the traditional hot/hot procedure (both phases 80 - 90 °C) the hot/cold procedure can be used. It is characterized by incorporation of the cold water phase (15 - 30 °C) into the hot oil phase which significantly shortens the time of manufacture.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)

# degussa.

*creating essentials*

Homogenization should be carried out below 30 °C in order to ensure that the waxes are largely recrystallized. The decisive criterion for production is the viscosity. Mechanical processing is discontinued when the viscosity is equal to that of the standard emulsion developed and tested in the laboratory.

## **Emulsifying machines**

Stirring equipment or planetary mixers with high sheering force are very suitable for the manufacture of creams and lotions on the laboratory and production scale, provided that they guarantee uniform work-up of the emulsion. Machines predominately used in the cosmetic industry, which are equipped with stirrer, stripper and rotor-stator homogenizer, fulfil all requirements for optimum emulsification. However, utilization of their maximum capacity may result in over-emulsification. High-pressure emulsifiers may cause problems because of the danger of over-

emulsification and liberation of water due to cavitation.

## **Recommended usage concentration**

4.0 - 6.0 % ABIL® WE 09

## **Packaging**

190 kg drum

## **Hazardous goods classification**

Information concerning

- classification and labelling according to regulations for transport and for dangerous substances
- protective measures for storage and handling
- measures in case of accidents and fires
- toxicity and ecological effects

is given in our material safety data sheets.

Goldschmidt GmbH  
Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)



## Guide Line Formulations

<b>W/O Lotion</b> <b>BK 05/94</b>	
<b>Phase A</b>	
ABIL® WE 09	5.0 %
TEGOSOFT® OS (Ethylhexyl Stearate)	6.0 %
TEGOSOFT® liquid (Cetearyl Ethylhexanoate)	6.0 %
Isohexadecane	6.0 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	0.5 %
Hydrogenated Castor Oil	0.5 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
LACTIL® (Sodium Lactate; Sodium PCA; Glycine; Fructose; Urea; Niacinamide; Inositol; Sodium Benzoate; Lactic Acid)	2.0 %
Water	73.5 %
Preservative, Parfum	q.s.

<b>W/O Cream</b> <b>F 1/95</b>	
<b>Phase A</b>	
ABIL® WE 09	5.0 %
Joboba (Buxus Chinensis) Oil	2.0 %
Mineral Oil	8.0 %
ABIL® Wax 9801 (Cetyl Dimethicone)	2.0 %
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	2.0 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	1.2 %
Hydrogenated Castor Oil	0.8 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
Water	78.5 %
Preservative, Parfum	q.s.

<b>W/O Cream with Avocado Oil</b> <b>BK 03/94</b>	
<b>Phase A</b>	
ABIL® WE 09	5.0 %
TEGOSOFT® CT (Caprylic/Capric Triglyceride)	10.0 %
Avocado (Persea Gratissima) Oil	10.0 %
Microcrystalline Wax (Paracera W 80, Paramelt B.V.)	1.2 %
Hydrogenated Castor Oil	0.8 %
<b>Phase B</b>	
Sodium Chloride	0.5 %
Water	72.5 %
Preservative, Parfum	q.s.

<b>W/O Sun Protection Cream (high SPF)</b> <b>Ma 28/98</b>	
<b>Phase A</b>	
ABIL® WE 09	5.00 %
ISOLAN® GI 34 (Polyglyceryl-4 Isostearate)	1.00 %
Mineral Oil (30 mPas)	2.00 %
Cyclopentasiloxane	6.25 %
ABIL® Wax 9801 (Cetyl Dimethicone)	3.00 %
Ceresin	1.00 %
Hydrogenated Castor Oil	0.50 %
Tocopheryl Acetate	1.00 %
Retinyl Palmitate	0.25 %
Ethylhexyl Methoxycinnamate	7.50 %
Zinc Oxide; Dimethicone (Z-Cote HP 1, BASF)	10.00 %
<b>Phase B</b>	
Phenylbenzimidazole Sulfonic Acid (30 %)	10.00 %
Sodium Chloride	0.50 %
Water	52.00 %
Preservative, Parfum	q.s.

E 04/01

Goldschmidt GmbH  
 Goldschmidtstrasse 100 | D-45127 Essen/Germany | P.O. Box D-45116 Essen  
 Phone: +49 (201) 173-2854 | Fax: +49 (201) 173-1828  
 personal-care@degussa.com | www.degussa-personal-care.com

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used. (Status: May 2003)